Amendment to the Claims:

The listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1-26. Cancelled.

27. (New) A method for constructing a reservoir model representative of an underground reservoir, including discretizing said reservoir by a set of grid cells, and associating with said reservoir model a permeability field constrained by a priori geologic data and dynamic data collected in said reservoir by measurements and observations comprising:

a) constructing an initial reservoir model including generating a permeability field in accordance with a stochastic model, coherent with the a priori geologic data;

b) identifying zones inside said reservoir;

c) calculating effective permeabilities of said zones and carrying out, by means of a simulator, a simulation of fluid flows, to estimate corrections to be brought to said effective permeabilities to improve calibration in relation to said dynamic data; and

d) propagating said corrections to said set of grid cells of said reservoir model, by means of an iterative optimization process comprising minimizing a

function which depends on said correction, using a technique of gradual deformation of realizations of said stochastic model.

28. (New) A method as claimed in claim 27, wherein said zones are defined either manually or automatically from said flow simulator.

29. (New) A method as claimed in claim 27, wherein flow simulation is carried out by means of a streamline simulator and said zones of said underground reservoir are identified by a set of grid cells traversed by one or more streamlines of fixed geometry.

30. (New) A method as claimed in claim 28, wherein flow simulation is carried out by means of a streamline simulator and said zones of said underground reservoir are identified by a set of grid cells traversed by one or more streamlines of fixed geometry.

31. (New) A method as claimed in claim 27, wherein said zones are identified as volume portions on a periphery of wells running through said reservoir, within a framework of well tests.

32. (New) A method as claimed in claim 28, wherein said zones are identified as volume portions on a periphery of wells running through said reservoir, within a framework of well tests.

33. (New) A method as claimed in claim 29, wherein said zones are identified as volume portions on a periphery of wells running through said reservoir, within a framework of well tests.

34. (New) A method as claimed in claim 30, wherein said zones are identified as volume portions on a periphery of wells running through said reservoir, within a framework of well tests.

35. (New) A method as claimed in claim 27, wherein at least one gradual deformation parameter is assigned to each of said zones.

36. (New) A method as claimed in claim 28, wherein at least one gradual deformation parameter is assigned to each of said zones.

37. (New) A method as claimed in claim 29, wherein at least one gradual deformation parameter is assigned to each of said zones.

38. (New) A method as claimed in claim 30, wherein at least one gradual deformation parameter is assigned to each of said zones.

39. (New) A method as claimed in claim 31, wherein at least one gradual deformation parameter is assigned to each of said zones.

40. (New) A method as claimed in claim 32, wherein at least one gradual deformation parameter is assigned to each of said zones.

41. (New) A method as claimed in claim 33, wherein at least one gradual deformation parameter is assigned to each of said zones.

42. (New) A method as claimed in claim 34, wherein at least one gradual deformation parameter is assigned to each of said zones.